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# Admissions to the Coronary Care Unit (CCU): Comparison With International Data

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In the beginning of the 20th century, cardiac diseases were responsible for less than the 10% of deaths in the entire world. At the end of the same century, it was found that they were responsible for 45% of total mortality in the developed countries, for 55% of total mortality in the emerging economically societies, while in the developing societies they accounted for 25% of all deaths. In America, 2.7% per year reduction of cardiac mortality was achieved during the past decade. We should underline that the rate of reduction was not uniform all over America<sup>1</sup>. In Europe, big inequality exists among various countries regarding the magnitude and the time trend of mortality from cardiovascular disease. Eastern European countries have higher mortality rates than the westerners and the same is true for northerners compared to southerners<sup>1</sup>. In Greece, according to the National Statistics Service<sup>2</sup>, cardiac diseases constituted the leading cause of deaths over the past decade.

During the year 2007, 529 patients were hospitalized in the Coronary Care Unit (CCU) of “Evangelismos” Hospital in Athens. The medical care of these patients was undertaken by the staff of the 1st Cardiology Department. Based on data derived from this patient population, we present a comparison against international data, in terms of their basic epidemiological features.

## **PATIENTS AND METHODS**

The sample of the study consisted of 529 patients hospitalized in the CCU of “Evangelismos” Hospital during the year 2007. Age, gender, admission diagnosis, days of hospitalization and final outcome were recorded. Statistical analysis follows and comparison with the international bibliography is also made.

## **RESULTS**

### *1. Admission Diagnosis*

Of the 529 patients:

- 117 patients were listed as acute myocardial infarction
- 56 patients as acute pulmonary edema
- 49 patients as acute coronary syndrome
- 46 patients as angina pectoris
- 46 patients as atrio-ventricular block
- 44 patients as heart failure
- 39 patients as atrial fibrillation
- 17 patients as ventricular tachycardia

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- 16 patients as electrical storm
- 14 patients as valvular heart disease
- 12 patients as heart attack or cardiogenic shock
- 11 patients as chest pain
- 9 patients as cardiomyopathy
- 8 patients as dyspnea - orthopnea
- 7 patients as pericarditis
- 6 patients as syncope
- 4 patients as digitalis intoxication
- 4 patients as endocarditis
- 4 patients as electrocution
- 3 patients as aortic aneurysm

Nine patients were admitted for non-cardiac disorder. Finally, 8 patients were admitted for IV administration of levosimendan due to intractable heart failure.

In order to accomplish a better study with the admission diagnosis and compare with other countries (through their own recordings), we maintained the following cardiac diagnoses: acute myocardial infarction, acute coronary syndrome, cardiac arrhythmias and heart failure.

As shown in Figure 1, for the year 2007 the most frequent admission diagnosis in our CCU was acute myocardial infarction. According to a recent study that was conducted in the USA and included data from all hospitals of the country, heart failure was the most frequent CCU admission diagnosis<sup>3</sup> (Figure 2). As it has been reported in the literature, variability exists among European countries regarding the frequency distribution of CCU admitting diagnoses. Recent statistical data for the most frequently recorded cardiac diagnoses from hospitals<sup>4</sup> in Norway are presented in Figure 3.

Comparing the statistical data from USA and Norway with ours in terms of the admission diagnosis, we can clearly see that we are close to the Norwegian data. The main admission diagnosis is acute myocardial infarction with similar percentages. On the contrary, USA shows differences from

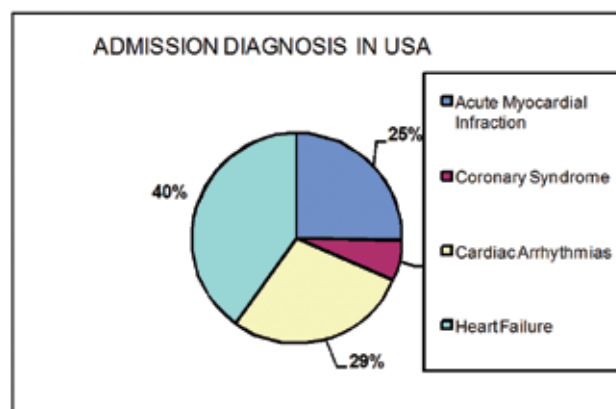


FIGURE 2. Admission diagnosis in USA

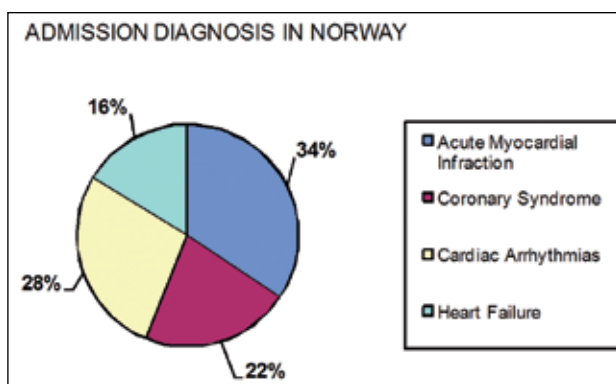


FIGURE 3. Admission diagnosis in Norway

the two European countries. In the USA the most frequent CCU admission diagnosis is heart failure, while in the two European countries heart failure is represented with the lowest percentage (Figure 4).

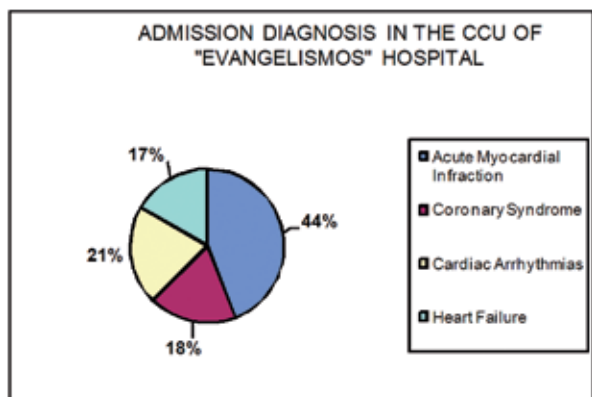


FIGURE 1. Distribution of admission diagnosis in the CCU of "Evangelismos" Hospital

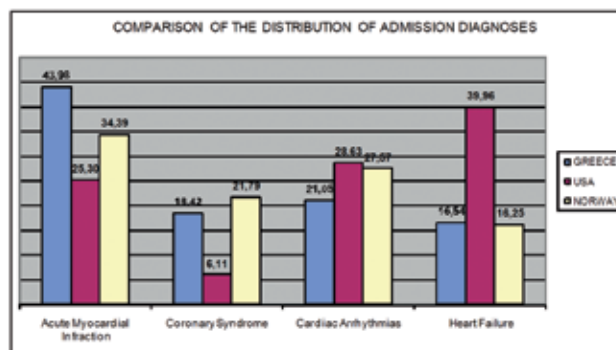


FIGURE 4. Comparison of the distribution of the 4 main cardiac diagnoses

## 2. Age and gender distribution

According to the literature, cardiac disease is mostly prevalent among middle-aged individuals and a sharp increase in its incidence after the 4th - 5th decade of life has been reported<sup>5</sup>. Moreover, the difference between the two genders regarding the age distribution of cardiac diseases has been well recognized. In Table 1, the distribution of patients hospitalized in our CCU according to the 4 main cardiac diagnoses as well as their gender and age, is presented. It can be clearly seen that cardiac disease appears in women 15-20 years later than in men. Nevertheless, for both genders, the highest frequency of appearance is between the 5th -6th decade of life. The proportion of men to women was 3 to 1 in our sample, and this finding strengthens the prevailing opinion that women are somehow more protected against cardiovascular disease (Figure 5). Similar age and gender distributions can be derived from the US statistical data. That is to say in the United States, the appearance of cardiac disease prevails in the middle-aged individuals and is more often in men.

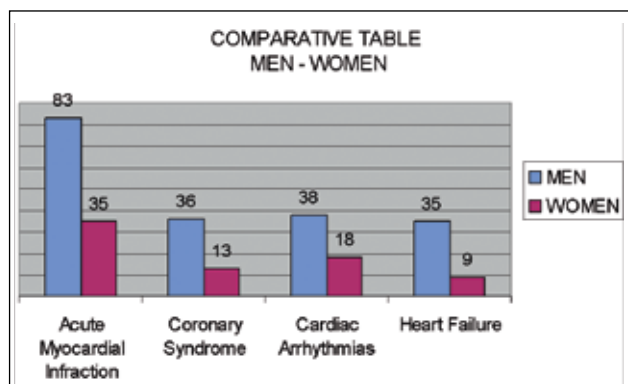


FIGURE 5. Men vs Women in the 4 categories of cardiac dis-

## 3. Days of hospitalization

Cardiac disease constitutes an important cause of morbidity for the population and absorbs a high percentage from the allocated economic resources of countries' health system<sup>6</sup>. The average stay in our CCU for the year 2007 was 2.36 days (Figure 6). If we comparatively examine the average days of treatment for patients in our CCU and in the USA, for the 4 main cardiac diseases under consideration, we realize that an average of 2 days difference exists (Figure 7). The patients admitted in the CCU of "Evangelismos" Hospital seem to stay in the hospital 2 days less than the ones in USA. This can be due to the widely used primary angioplasty for the treatment of acute myocardial infarction in our hospital. Ninety nine (83.89%) out of the 118 patients hospitalized with acute myocardial infarction during 2007, were submitted to primary angioplasty. Nevertheless, we should keep in mind that we compare data from one Unit with those derived from a whole country where the availability of primary angioplasty is not homogenous.

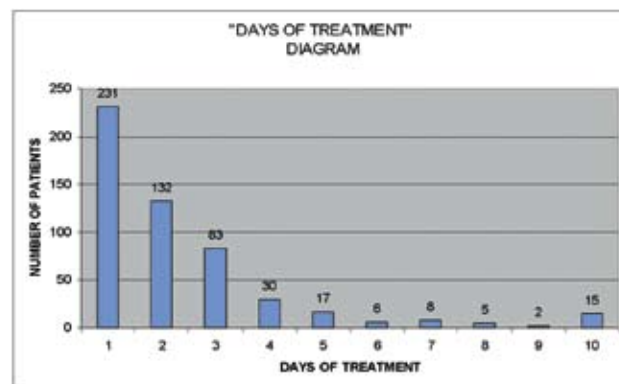


FIGURE 6. Days of hospitalization in our CCU

Table 1. Age and gender distribution for the 4 main diagnoses in the CCU

		AGE	<30	30 - 39	40 - 49	50 - 59	60 - 69	70 - 79	>80
GENDER									
Acute Myocardial Infarction	MEN		1	3	10	22	22	20	5
	WOMEN		0	0	4	3	7	14	7
Acute Coronary Syndrome	MEN		0	1	3	5	12	10	5
	WOMEN		0	0	0	1	2	8	2
Cardiac Arrhythmias	MEN		0	0	1	12	8	14	3
	WOMEN		0	0	0	2	6	5	5
Heart Failure	MEN		0	0	0	3	15	15	2
	WOMEN		0	0	2	0	0	4	3

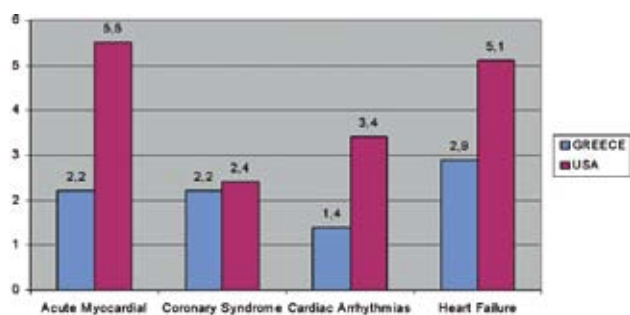


FIGURE 7. Average length on hospitalization. Comparison with US data.

#### 4. Mortality

A declining trend in in-hospital cardiac mortality has been internationally recognized. During the year 2007, 43 patients (8.12%) died out of the 529 patients hospitalized in the CCU of the “Evangelismos” Hospital. Eight of them (18.6%) were women. All deceased patients were more than 50 years old and the majority were between 70 with 80 years old.

#### CONCLUSIONS

During the last decade some variability has been observed in terms of cardiac morbidity and mortality in various populations. By studying and comparing epidemiological data from

these populations is important since it can add more insight into the pathogenesis of cardiac disease. We analyzed data derived from a sample of 529 patients admitted in the 1st Cardiology Department of “Evangelismos” Hospital and hospitalized in the CCU. From the analysis it became clear that no important differences against international data exist in the rates of morbidity and mortality. Of note, the average length of in-hospital stay was shorter in our Unit. Nevertheless, in order to derive safer conclusions, data from several years have to be analyzed.

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